

GUJARAT ARTS AND SCIENCE COLLEGE, ELLISBRIDGE		
PROJECT / DISSERATATION WORK		
YEAR : - 2022 - 23		
MICROBIOLOGY		
Sr. No.	Name of Student	Topic Name
1	Mr. Kshitij Bhatt	Screen & Optimazation of Ammonia Nitrogen Degrading Bacteria from Industrial waste water.
2	Ms. Purvika Kandel	isolation and Characterization of ammonia nitrogen degrading organisms from industrial waste water
3	Mr. Bhalara Vedant	Screen & Optimazation of phenol Degrading strain from waste water
4	Dodiya Mittal	Exploring Antagonistic activity of Bacillus pumilus VNM1 Against phytopathogenic Fungi
5	Faridi Fiza	Screen & Optimazation of Indegenous Exopolysaccharide (EPS) producing soil Bacteria for Agriculture waste manegment.
6	Ms. Goswami Disha	Isolation and identification of different bacteria associated with yolk sac infection in chicks
7	Mr. Unnat Chaudhary	Analysis of Phenol Biodegradation of industrial wast water
8	Pandey Vishakha	Exploring Biocontrol Tactis of Baciluss Pumilis for growth Enhasment on Oats
9	Nisha Mevada	Antagonistics activity of indigenous endophytes against phytopathogenic fungi
10	Ms. Parmar Pooja	EVALUATION OF TANNASE FROM <i>Aspergillus Sp.</i> FOR TANNIN REMOVAL OF DIFFERENT FRUIT JUICES
11	Ms. Patel Dhruvi	EVALUATION OF TANNASE FROM <i>Aspergillus Sp.</i> FOR TANNIN REMOVAL OF DIFFERENT FRUIT JUICES
12	Ms. Gaytri Chrttiyar	EVALUATION OF TANNASE FROM <i>Aspergillus Sp.</i> FOR TANNIN REMOVAL OF DIFFERENT FRUIT JUICES



Gujarat Arts and Science College
Perpetuating Education Through Generations
Estd:1860

Government of Gujarat

GUJARAT ARTS AND SCIENCE COLLEGE AHMEDABAD-380006

MICROBIOLOGY DEPARTMENT

PROJECT REPORT
ACADEMIC YEAR-2022-2023

Soft copy attachments:

- Project Report / Thesis title page
- Certificate
- Summary of the submitted Project

**SCREENING AND OPTIMIZATION OF AMMONIA NITROGEN DEGRADING
BACTERIA FROM INDUSTRIAL WASTEWATER**

A DISSERTATION SUBMITTED TO
DEPARTMENT OF MICROBIOLOGY AND BIOTECHNOLOGY
UNIVERSITY SCHOOL OF SCIENCE

GUJARAT UNIVERSITY
AHMEDABAD-380009



IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF
MASTERS OF SCIENCE

IN

MICROBIOLOGY

BY

KSHITISH BHATT

EXAM NO.: -

COLLEGE ROLL NO.: - 15



GUJARAT ARTS AND SCIENCE COLLAEGE, AHMEDABAD-380006

MARCH 2023



GUJARAT ARTS & SCIENCE COLLEGE

ELISSBRIDGE, AHMEDABAD – 380006

(Government of Gujarat)

(NAAC Accredited Grade 2.83)

Phone:079-26446939, Fax:079-26446939, Email:

gaseprin@gmail.com

Ref No.

No/GASC/

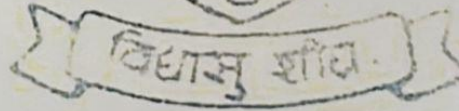
Date: 10-4-2023

CERTIFICATE

This is clearly certify that this dissertation entitled **“SCREENING AND OPTIMIZATION OF AMMONIA NITROGEN DEGRADING BACTERIA FROM INDUSTRIAL WASTEWATER”** submitted to Department of Microbiology and Biotechnology University School of Sciences, Gujarat University, Ahmedabad, 380009 by **Mr. KSHITISH RAJENDRA KUMAR BHATT** for the degree of Master of Science in Microbiology is the bonafide record of original work done by the candidate, from academic year June 2022- April 2023 under the supervision of **Dr. Chaitanya Kumar Jha**. The work was planned, organised and executed in Microbiology Department, Gujarat Arts and Science College, Ahmedabad, 380006. This study has not previously formed the basis for the award of any degree, diploma, fellowship or any other similar tide. We further certify that the entire thesis represents the independent work of **Kshitish Rajendra Kumar Bhatt** and all research was undertaken by the candidate under my supervision and guidance.

Date:

Place: Ahmedabad



Dr. Chaitanya Kumar Jha
Head of P.G. center of Microbiology
Gujarat Arts and Science College
Ahmedabad – 380006
India.

Principal
Gujarat Arts and Science College
Ellisbridge, Ahmedabad –
380006
India.



GUJARAT POLLUTION CONTROL BOARD

PARYAVARAN BHAVAN
Sector-10-A, Gandhinagar-382 010
Phone : (079) 23226295
Fax : (079) 23232156
Website : www.gpcb.gov.in

Certificate

This is to certify that **Mr. Kshitij R. Bhatt** is a student of M.Sc. Microbiology from **Gujarat Arts & Science College, Ahmedabad** was associated with **Gujarat Pollution Control Board, Gandhinagar** for his internship work on **“Isolation And Identification Of Ammonical Nitrogen Degrading Organisms from Industrial Wastewater”**. He has taken training during 1st February 2023 to 31st march 2023. He was found to be sincere in work.

(R.B. Trivedi)
Head-Research & Development Cell

D.M. Thaker
Member Secretary

Date: 12-4-2023
Place: Gandhinagar

Clean Gujarat Green Gujarat
ISO - 9001 - 2008 & ISO - 14001 - 2004 Certified Organisation

Chapter 6: CONCLUSION:

In conclusion, bacteria play a crucial role in the degradation of ammoniacal nitrogen in the environment.

They are responsible for converting toxic ammonia into less harmful nitrate compounds through a process known as nitrification.

This process involves two types of bacteria: ammonia-oxidizing bacteria and nitrite-oxidizing bacteria. Ammonia-oxidizing bacteria convert ammonia to nitrite, which is then converted to nitrate by nitrite-oxidizing bacteria.

These nitrates can then be used as a source of nutrients by plants and other organisms. However, excessive levels of ammoniacal nitrogen can lead to eutrophication and other environmental problems.

Therefore, it is important to monitor and manage the levels of ammoniacal nitrogen in the environment to maintain a healthy ecosystem.

However, it is important to note that the efficiency of ammoniacal nitrogen removal depends on various factors such as temperature, pH, and the availability of nutrients.

Therefore, further research is needed to optimize the conditions for bacterial nitrification and improve the efficiency of ammoniacal nitrogen removal from wastewater.

By performing this experiment this study, we were able to isolate mainly two types of bacterial colony (XY1,XY2), capable of efficiently degrading ammoniacal nitrogen. These bacteria can be potentially used in the development of effective bioremediation techniques for treating wastewater.

The Isolated Bacteria were also inoculated into wastewater that contain high amount BOD, COD, Ammoniacal nitrogen concentration. The XY2 bacteria are excellent degradation of around 92.95 % at pH 8 , temperature 30°C ,10% inoculum size , 131 mg/l concentration after 120 h incubation time.

In wastewater the bacteria XY1+XY2 was add and that consortium had degradation of ammonia nitrogen of 95.54 % at 120 h incubation time with 10% inoculum size, the isolation of these bacterial strains is an important contribution to the field of wastewater treatment and has practical applications for improving the efficiency of biological nitrogen removal from wastewater.

**ISOLATION AND CHARACTERIZATION OF AMMONIA NITROGEN
DEGRADING ORGANISMS FROM INDUSTRIAL WASTEWATER.**

A DISSERTATION SUBMITTED TO
DEPARTMENT OF MICROBIOLOGY AND BIOTECHNOLOGY
UNIVERSITY SCHOOL OF SCIENCE
GUJARAT UNIVERSITY
AHMEDABAD-380009



IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF
MASTERS OF SCIENCE

IN

MICROBIOLOGY

BY

PURVIKA B KANDEL

EXAM NO.: -

COLLEGE ROLL NO.: - 05



GUJARAT ARTS AND SCIENCE COLLEGE, AHMEDABAD-380006

MARCH 202



GUJARAT ARTS & SCIENCE COLLEGE

ELISSBRIDGE, AHMEDABAD – 380006

(Government of Gujarat)

(NAAC Accredited Grade 2.83)

Phone:079-26446939, Fax:079-26446939, Email:

gascprin@gmail.com

Ref No.

No/GASC/

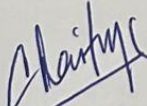
Date: 10-4-2023


CERTIFICATE

This is clearly certify that this dissertation entitled **“ISOLATION AND CHARACTERIZATION OF AMMONIA NITROGEN DEGRADING ORGANISMS FROM INDUSTRIAL WASTEWATER”** submitted to Department of Microbiology and Biotechnology University School of Sciences, Gujarat University, Ahmedabad, 380009 by **Ms. Purvika Bamdev Kandel** for the degree of Master of Science in Microbiology is the bonafide record of original work done by the candidate, from academic year June 2022- April 2023 under the supervision of **Dr. Chaitanya Kumar Jha**. The work was planned, organised and executed in Microbiology Department, Gujarat Arts and Science College, Ahmedabad, 380006. This study has not previously formed the basis for the award of any degree, diploma, fellowship or any other similar tide. We further certify that the entire thesis represents the independent work of **Purvika Bamdev Kandel** and all research was undertaken by the candidate under my supervision and guidance.

Date:

Place: Ahmedabad


Dr. Chaitanya Kumar Jha
Head of P.G. center of Microbiology
Gujarat Arts and Science College
Ahmedabad – 380006
India


Principal

Gujarat Arts and Science College
Ellisbridge, Ahmedabad –
380006
India.



GUJARAT POLLUTION CONTROL BOARD

PARYAVARAN BHAVAN

Sector-10-A, Gandhinagar-382 010

Phone : (079) 23226295

Fax : (079) 23232156

Website : www.gpcb.gov.in

Certificate

This is to certify that **Ms. Purvika B. Kandel** is a student of M.SC. Microbiology from **Gujarat Arts & Science College, Ahmedabad** was associated with **Gujarat Pollution Control Board, Gandhinagar** for her internship work on **“Isolation And Identification Of Ammonical Nitrogen Degrading Organisms from Industrial Wastewater”**. She has taken training during 1st February 2023 to 31st march 2023. She was found to be sincere in work.

(R.B. Trivedi)

Head-Research & Development Cell

D.M. Thaker

Member Secretary

Date: 12-4-2023

Place: Gandhinagar

Clean Gujarat Green Gujarat

ISO - 9001 - 2008 & ISO - 14001 - 2004 Certified Organisation

5. CONCLUSION:

Present study was aimed to optimize the processes for ammonia nitrogen degradation so maximum ammonia nitrogen degradation activity which can be obtained from different wastewater sample such as industrial wastewater. Two different bacteria were selected for the optimization procedure. For the checking of production of AN degradation bacteria from the selected isolates, the isolates were grown on nutrient agar plate containing ammonia sulphate as Nitrogen source.

The selected isolates shown the zone of hydrolysis on starch agar plate when iodine was poured, thus, confirming the growth of the Ammonia nitrogen degrading bacteria from the isolates. After that, optimum pH and temperature of each isolate was determined according to kjeldhal method to assess the degradation efficiency produced by the respective isolates. The isolate showed the maximum ammonia nitrogen degradation at pH 7 and temperature 37°C. Keeping the ideal growth conditions, in which degradation activity of isolates obtained was above 88%

From the microscopic characterization of the isolate, the organisms was identified as gram positive with few large clumps arrangement and long rod shape.

Optimization procedure was followed with different parameters as to identify optimum growth conditions of isolates for Ammonia degradation. The study reported that bacterial isolate XY1 gave maximum degradation activity above 88%. The XY1 isolate gave maximum ammonia nitrogen degradation activity when effect of ammonia nitrogen concentration was studied. The optimum ammonia nitrogen concentration was found to be 200mg/L with 5% inoculum.

Temperature influence on the degradation activity was examined by incubating the cultures at different temperatures. The result obtained depicted optimum temperature to be 37°C. The maximum degradation activity obtained was 70%. Study for the effect of pH on ammonia nitrogen degradation by isolated bacteria was done, where the ammonia nitrogen degradation concentration was maximum at pH 7.0. Therefore, it can be concluded that isolates XY1 yields maximum degradation when grown at optimum growth conditions. The optimum growth condition was found to be 37°C when cultures were incubated for 72 hours having 10% inoculum size that contains 8mg/L of ammonia concentration. The optimum pH of the growth was noted to be 7.0

Industrial wastewater was also taken which contain ammonia nitrogen into it with pH 7, the isolate XY1 was inoculated as to check the ammonia nitrogen degradation activity. The ammonia nitrogen concentration in wastewater was 131 mg/L in which the isolate degraded 92.95% of it.

Screening and optimization of phenol degrading strain from wastewater.

A dissertation submitted to
Department of Microbiology and Biotechnology
University School of science
Gujarat university ahmedabad-380009



In partial fulfillment to requirement of the degree of

Master of Science

In

Microbiology

By

Bhalara Vedant kumar

Exam No:

(college Roll No: 11)



Microbiology Department
Gujarat Arts and Science college, Ellisbridge, Ahmedabad-380006



सत्यमेव जयते

Estd. 1863

GUJARAT ARTS & SCIENCE COLLEGE

ELLISBRIDGE, AHMEDABAD - 380 006.

(Government of Gujarat)

(NAAC Accredited Grade 2.83)

Phone : 079-26446939, Fax : 079-26446939, Email : gascprin@gmail.com

Ref No.

No./GASCI

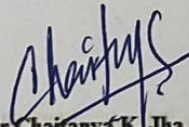
Date 10-4-2023

Certificate

This is to certify that this dissertation entitled "Screening and optimization of phenol degrading strain from wastewater." submitted to Department of Microbiology and Biotechnology University School of Sciences, Gujarat University, Ahmedabad,380009 by Mr. Bhalara Vedant Kumar for the degree of Master of Science in Microbiology is the bonafide record of original work done by the candidate, from academic year June 2022-April 2023, under the supervision of Dr. Chaitanya Kumar Jha. The work was planned, organised and executed in Microbiology Department, Gujarat Arts and Science College, Ahmedabad,380006. This study has not previously formed the basis for the award of any degree, diploma, fellowship or any other similar title. We further certify that the entire thesis represents the independent work of Bhalara Vedant and all research was undertaken by the candidate under any supervision and guidance.

Date :

Place : Ahmedabad


Dr. Chaitanya K. Jha.

Head of P.G. centre of Microbiology.

Gujarat Arts and Science College,

Ahmedabad.


Principal

Gujarat Arts and Science

college, Ahmedabad

India.



GUJARAT POLLUTION CONTROL BOARD

PARYAVARAN BHAVAN

Sector-10-A, **Gandhinagar**-382 010

Phone : (079) 23226295

Fax : (079) 23232156

Website : www.gpcb.gov.in

Certificate

This is to certify that **Mr. Vedant Kumar Bhalar** is a student of M.sc. Microbiology from **Gujarat Arts & Science College, Ahmedabad** was associated with **Gujarat Pollution Central Board, Gandhinagar** for his internship work on "**Isolation Of Phenol Degrading Bacteria from Industrial Wastewater**". He has taken training during 1st February 2023 to 31st march 2023. He was found to be sincere in work.

(R.B. Trivedi)

Head-Research & Development Cell

D.M. Thaker
Member Secretary

Date: 12-4-2023

Place: Gandhinagar

Clean Gujarat Green Gujarat

ISO - 9001 - 2008 & ISO - 14001 - 2004 Certified Organisation

**EXPLORING ANTAGONISTIC
ACTIVITY OF *Bacillus pumilus* VNM1
AGAINST PHYTOPATHOGENIC FUNGI.**

**A
DISSERTATION SUBMITTED TO THE
DEPARTMENT OF MICROBIOLOGY AND BIOTECHNOLOGY,
SCHOOL OF SCIENCES,
GUJARAT UNIVERSITY,
AHMEDABAD**



**IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE
DEGREE
OF
MASTER OF SCIENCE
IN
MICROBIOLOGY
BY
DODIYA MITTAL PRAVINSINH
UNI.SEAT NO: -**



**GUJARAT ARTS AND SCIENCE COLLEGE, AHMEDABAD: 380006
APRIL 2023**

5.1 Conclusion

- Two isolates(UV1 and UV3) were obtained from wastewater that resist phenol concentration at 1200ppm on MSM agar plate .
- Optimum temperature for UV1 was 30°C and UV2 was 35°C.
- Optimum pH for UV1 was 7 and UV2 was pH 8.
- Both UV1 and UV2 were able to grow in 400ppm, 800ppm and 1200ppm but UV1 was able to grow in 1600 ppm of phenol concentration.
- Lab scale degradation was done by UV1 and UV3.
 - i) UV1 degraded completely 400ppm and 800ppm of phenol within 48 and 72 hours. But it only degraded 98% of 1200ppm and 81% of 1600ppm of phenol till 72 hours.
 - ii) UV3 degrades completely 400ppm and 800ppm of phenol within 48 and 72 hours. But it only degraded 75% of 1200ppm and it was not able to degrade 1600ppm.
- Here UV1 shows the best result in degrading phenol. hence, can be further used as bioremediation technique.



GUJARAT ARTS & SCIENCE COLLEGE

ELISSBRIDGE, AHMEDABAD – 380006

(Government of Gujarat)

(NAAC Accredited Grade 2.83)

Phone:079-26446939, Fax:079-26446939, Email:gascprin@gmail.com

Ref No.

No/GASC/

Date: 8-4-2023

CERTIFICATE

This is clearly certify that the work presented in the dissertation entitled "Exploring antagonistic activity of *Bacillus pumilus* VNM1 against phytopathogenic fungi". Submitted by Ms. Mittalben Pravinsinh Dodiya Microbiology semester 4, has been carried out in P.G centre of Microbiology, Gujarat Arts and Science College, Ahmedabad – 380006, during the academic year 2018-2020 in partial fulfilment of the requirement for the Degree of Master of Science in Microbiology. I further certify that this dissertation or part thereof has not previously been submitted elsewhere for the degree or diploma or any other academic award of this university or any other university.

Date: 08/04/2023

Place: Ahmedabad

Supervising leader/ Guide

Dr. Chaitanya Kumar Jha
P.G. Center of Microbiology
Gujarat Arts and Science College
Ellisbridge, Ahmedabad – 380006
India

Principal,
Gujarat Arts and Science College
Ellisbridge, Ahmedabad – 380006
India.

CONCLUSION:

- Eight isolates having the ability to produce antibiotic were isolated from the Junagadh district of Gujarat by using the crowded plate technique.
- These isolates were further determined for its antagonistic activity against the phytopathogenic fungi in which VNM1, VNM2, VNM4, VNM5 and VNM8 shows the highest results.
- All the isolates were further estimated for the biocontrol traits which include ammonia and HCN production. all eight isolates were showing the positive result in the ammonia production. But VNM1, VNM3, VNM4 and VNM8 only shows the positive results in the HCN production test.
- Plant growth promoting activity was checked by using the zinc solubilizing assay, in which only VNM4 and VNM7 shows the negative result and VNM1 shows the highest result.
- The pot study was conducted on *Cicer arietanum*(chickpea), in which VNM1 only shows the highest result than other isolates.
- In all the experiments which was conducted for the determination of biocontrol activity and plant growth promoting activity, the VNM1 was determined to be promising biocontrol agent.
- The identification of VNM1 was done by cultural and morphological characteristics, biochemical tests and 16s rRNA sequencing. VNM1 was identified as *Bacillus pumilus*.

**SCREENING AND CHARACTERIZATION OF INDIGENOUS
EXOPOLYSACCHARIDE (EPS) PRODUCING SOIL BACTERIA
FOR AGRICULTURAL WASTE MANAGEMENT**

A DISSERTATION SUBMITTED TO

DEPARTMENT OF MICROBIOLOGY AND BIOTECHNOLOGY

UNIVERSITY SCHOOL OF SCIENCE

GUJARAT UNIVERSITY

AHMEDABAD-380009



IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTERS OF SCIENCE

IN

MICROBIOLOGY

BY

FARIDI FIZA A.

EXAM NO. :-

COLLEGE ROLL NO. :- 04



GUJARAT ARTS AND SCIENCE COLLEGE, AHMEDABAD-380006

MARCH 2023



GUJARAT ARTS & SCIENCE COLLEGE

ELLISBRIDGE, AHMEDABAD – 380006

(Government of Gujarat)

(NAAC Accredited Grade 2.83)

Phone:079-26446939, Fax:079-26446939, Email: gascprin@gmail.com

Ref No.

No/GASC/

Date: 08-4-2023

CERTIFICATE

This is clearly certify that the work presented in the dissertation entitled **“Screening and characterization of Indigenous exopolysaccharide(EPS) producing soil bacteria for agricultural waste management”**. Submitted by **Ms. Fiza Asifmajhar Faridi** of Microbiology semester 4, has been carried out in P.G center of Microbiology, Gujarat Arts and Science College, Ahmedabad – 380006, during the academic year 2022-2023 in partial fulfilment of the requirement for the Degree of Master of Science in Microbiology.

I further certify that this dissertation or part thereof has not previously been submitted elsewhere for the degree or diploma or any other academic award of this university or any other university.

Date: 08 /04/2023

Place: Ahmedabad

Supervising leader/ Guide

Dr. Chaitanya Kumar Jha

P.G. Center of Microbiology

Gujarat Arts and Science College

Ellisbridge, Ahmedabad – 380006

India

Co-Ordinator/ Head

P.G. Center of Microbiology

Gujarat Arts and Science College

Ellisbridge, Ahmedabad – 380006

India

Conclusion :

- Three isolates producing EPS FKH13, FKH 12 and 2V were isolated from the Narmada district region of Gujarat.
- All the three isolates were further used for the EPS production, which is characterized by its dry weight estimation and viscosity.
- The isolate FKH13 shows the maximum result in both characterisation assay than the other two isolates FKH12 and 2V.
- All the three isolates shows the biofilm capability on the slide. In the quantification assay to estimate biofilm, FKH13 shows the highest result.
- The lab scale application of biodegradation of agricultural waste shows positive result by showing the partial degradation after the 21 days of incubation.
- The identification of FKH13 was done by cultural and morphological characterization, biochemical tests and 16s rRNA sequencing. FKH13 was identified as *Bacillus pumilus*.

**ISOLATION AND IDENTIFICATION OF DIFFERENT
BACTERIA ASSOCIATED WITH YOLK SAC INFECTION IN
CHICKS**

A DISSERTATION SUBMITTED TO
THE DEPARTMENT OF MICROBIOLOGY AND BIOTECHNOLOGY

UNIVERSITY SCHOOL OF SCIENCES

GUJARAT UNIVERSITY

AHMEDABAD - 380 009



IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE

DEGREE OF

Master of Science

IN

MICROBIOLOGY

BY

GOSWAMI DISHA KALPESHGIRI

SEAT NO:

ROLL NO:08



GUJARAT ARTS AND SCIENCE COLLEGE,

AHMEDABAD-380006

APRIL,2023



GUJARAT ARTS & SCIENCE COLLEGE

ELISSBRIDGE, AHMEDABAD – 380006

(Government of Gujarat)

(NAAC Accredited Grade 2.83)

Phone:079-26446939, Fax:079-26446939,

Email: gascprin@gmail.com

Ref No.

No/GASC/

Date: 10-4-2023

CERTIFICATE

This is clearly certify that this dissertation entitled **“ISOLATION AND IDENTIFICATION OF DIFFERENT BACTERIA ASSOCIATED WITH YOLK SAC INFECTION IN CHICKS”** submitted to Department of Microbiology and Biotechnology University School of Sciences, Gujarat University, Ahmedabaad, 380009 by **Ms GOSWAMI DISHA KALPESHGIRI**, for the degree of Master of Science in Microbiology is the bonafide record of original work done by the candidate, from academic year June 2022- April 2023 under the supervision of **Dr. Chaitanya Kumar Jha**. The work was planned, organised and executed in Microbiology Department, Gujarat Arts and Science College, Ahmedabad, 380006. This study has not previously formed the basis for the award of any degree, diploma, fellowship or any other similar tide. We further certify that the entire thesis represents the independent work of **GOSWAMI DISHA KALPESHGIRI** and all research was undertaken by the candidate under my supervision and guidance

Date:

Place: Ahmedabad

Supervising leader/ Guide

Dr. Chaitanya Kumar Jha
P.G. Centre of Microbiology
Gujarat Arts and Science College
Ellisbridge, Ahmedabad – 380006

Principal
Gujarat Arts and Science College
Ellis bridge, Ahmedabad –
380006
India



GOVERNMENT OF GUJARAT,
OFFICE OF THE DEPUTY DIRECTOR OF A.H.,
FMD TYPING SCHEME, FIRST FLOOR, WING A,
PASHUPALAN SANKUL, MAKARBA,
AHMEDABAD- 380051

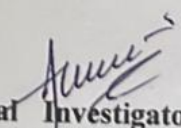


Date:- 10/4/2023

CERTIFICATE

This is to certify that the Thesis entitled “**Isolation and Identification of Different bacteria associated with Yolk sac Infection in Chicks**” by **Goswami Disha Kalpeshgiri** from Department of Microbiology, Gujarat Arts and Science College, Ahmedabad in Partial fulfillment for the award of the Degree of Master of Science in Microbiology. This work is carried out by her under my supervision at Pashupalan Sankul, Makarba, Ahmedabad-380051 from **1st January to 15th March, 2023.**

This thesis fulfils the requirements and regulations of the University and meets the necessary standards for submission.


Principal Investigator and
Deputy Director of A.H.,
F.M.D. Typing Scheme,
Ahmedabad-380 051

7.CONCLUSION:

The results of the present study in three different hatcheries (Makarba poultry farm, Shakti poultry farm and Charotar breeding farm and hatchery) from cases of omphalitis in chick show that *E.coli*, *Pseudomonas* were the predominant bacteria species isolated from yolk sac samples indicating that these bacteria are the major cause of yolk sac infection. This study found that Although antimicrobials such as Gentamicin, Chloramphenicol, tetracycline and Amikacin may be potentially effective for treatment of yolk sac infection in chicks. The isolation of multi-drug resistant strains of *E.coli* and *Proteus* species from cases of chicks suffering from omphalitis from all hatcheries studied is alarming as this resistance may spread to microbes infecting man and animals. From the study it is concluded that Awareness should be created among the poultry farms for the implementation of better control and subsequent reduction of yolk sac infection.

Analysis of phenol biodegradation of industrial wastewater

A dissertation submitted to
Department of Microbiology and Biotechnology
University School of science
Gujarat university ahmedabad-380009



In partial fulfillment to requirement of the degree of

Master of Science

In

Microbiology

By

Unnat Girishbhai chaudhry

Exam No:

(college Roll No: 09)



Microbiology Department
Gujarat Arts and Science college, Ellisbridge, Ahmedabad-380006



सत्यमेव जयते

Estd. 1863

GUJARAT ARTS & SCIENCE COLLEGE

ELLISBRIDGE, AHMEDABAD - 380 006.

(Government of Gujarat)
(NAAC Accredited Grade 2.83)

Phone : 079-26446939, Fax : 079-26446939, Email : gascprin@gmail.com

Ref No.

No./GASCI

Date 10-4-2023

Certificate

This is to certify that this dissertation entitled "ANALYSIS OF PHENOL BIODEGRADATION OF INDUSTRIAL WASTEWATER" submitted to Department of Microbiology and Biotechnology University School of Sciences, Gujarat University, Ahmedabad, 380009 by Mr. Unnat Girishbhai Chaudhary for the degree of Master of Science in Microbiology is the bonafide record of original work done by the candidate, from academic year June 2022-April 2023, under the supervision of Dr. Chaitanya Kumar Jha. The work was planned, organised and executed in Microbiology Department, Gujarat Arts and Science College, Ahmedabad, 380006. This study has not previously formed the basis for the award of any degree, diploma, fellowship or any other similar title. We further certify that the entire thesis represents the independent work of Unnat Chaudhary all research was undertaken by the candidate under any supervision and guidance.

Date :

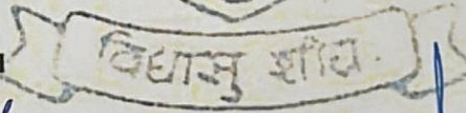
Place : Ahmedabad

Dr. Chaitanya K. Jha.

Head of P.G. centre of Microbiology.

Gujarat Arts and Science College,

Ahmedabad.



Principal

Gujarat Arts and Science

college, Ahmedabad

India.



GPCB

GUJARAT POLLUTION CONTROL BOARD

PARYAVARAN BHAVAN
Sector-10-A, Gandhinagar-382 010

Phone : (079) 23226295

Fax : (079) 23232156

Website : www.gpcb.gov.in

Certificate

This is to certify that **Mr. Unnat G. Chaudhary** is a student of M.SC. Microbiology from **Gujarat Arts & Science College, Ahmedabad** was associated with **Gujarat Pollution Control Board, Gandhinagar** for his internship work on "**Isolation Of Phenol Degrading Bacteria from Industrial Wastewater**". He has taken training during 1st February 2023 to 31st march 2023. He was found to be sincere in work.

(R.B. Trivedi)
Head-Research & Development Cell

D.M. Thaker
Member Secretary

Date: 12-4-2023
Place: Gandhinagar

Clean Gujarat Green Gujarat

ISO - 9001 - 2008 & ISO - 14001 - 2004 Certified Organisation

5.1 Conclusion

- Two isolates(UV1 and UV3) were obtained from wastewater that resist phenol concentration at 1200ppm on MSM agar plate .
 - Optimum temperature for UV1 was 30°C and UV2 was 35°C.
 - Optimum pH for UV1 was 7 and UV2 was pH 8.
 - Both UV1 and UV2 were able to grow in 400ppm, 800ppm and 1200ppm but UV1 was able to in 1600 ppm of phenol concentration.
 - Lab scale degradation of was done by UV1 and UV3.
 - i) UV1 degraded completely 400ppm and 800ppm of phenol with in 48 and 72 hours. But it only degraded 98% of 1200ppm and 81 % of 1600ppm of phenol till 72 hours.
 - ii) UV3 degrades completely 400ppm and 800ppm of phenol with in 48 and 72 hours. But it only degraded 75% of 1200ppm and it was not able to degrade 1600ppm.
 - Here UV1 shows the best result in degrading phenol. hence, can be further used as bioremediation technique.
-



GUJARAT ARTS & SCIENCE COLLEGE

ELISSBRIDGE, AHMEDABAD – 380006

(Government of Gujarat)

(NAAC Accredited Grade 2.83)

Phone:079-26446939, Fax:079-26446939, Email:

gascprin@gmail.com

Ref No.

No/GASC/

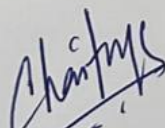
Date: 11-04-2023

CERTIFICATE


This is clearly certify that this dissertation entitled “EXPLORING BIOCONTROL TACTIS OF *BACILLUS PUMILIS* FOR GROWTH ENHANCEMENT IN OATS” submitted to Department of Microbiology and Biotechnology University School of Sciences, Gujarat University,Ahmedabaad,380009 by Ms. PANDEY VISHAKHA RAJESH for the degree of Master of Science in Microbiology is the bonafide record of original work done by the candidate, from academic year June 2022- April 2023 under the supervision of Dr. Chaitanya Kumar Jha. The work was planned, organised and executed in Microbiology Department, Gujarat Arts and Science College, Ahmedabad, 380006. This study has not previously formed the basis for the award of any degree, diploma, fellowship or any other similar tide. We further certify that the entire thesis represents the independent work of Pandey Vishakha Rajesh and all research was undertaken by the candidate under my supervision and guidance.

Date:

Place: Ahmedabad


Dr. Chaitanya Kumar Jha
Head of P.G. center of Microbiology
Gujarat Arts and Science College
Ahmedabad – 380006
India.

Principal


Gujarat Arts and Science College
Ellisbridge, Ahmedabad – 380006
India.

**ISOLATION AND IDENTIFICATION OF DIFFERENT
BACTERIA ASSOCIATED WITH YOLK SAC INFECTION IN
CHICKS**

A DISSERTATION SUBMITTED TO
THE DEPARTMENT OF MICROBIOLOGY AND BIOTECHNOLOGY
UNIVERSITY SCHOOL OF SCIENCES

GUJARAT UNIVERSITY
AHMEDABAD - 380 009



IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE
DEGREE OF

Master of Science
IN
MICROBIOLOGY
BY

GOSWAMI DISHA KALPESHGIRI
SEAT NO:
ROLL NO:08



GUJARAT ARTS AND SCIENCE COLLEGE,
AHMEDABAD-380006

APRIL,2023

**ANTAGONISTIC ACTIVITY OF INDEGENOUS ENDOPHYTES
AGAINST *Fusarium oxysporum***

A DISSERTATION SUBMITTED TO
DEPARTMENT OF MICROBIOLOGY AND BIOTECHNOLOGY
UNIVERSITY SCHOOL OF SCIENCE
GUJARAT UNIVERSITY
AHMEDABAD-380009



IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF
MASTERS OF SCIENCE

IN

MICROBIOLOGY

BY

NISHA .N. MEVADA

UNIVERSITY EXAM NO. :-

COLLEGE ROLL NO. :- 10



GUJARAT ARTS AND SCIENCE COLLEGE, AHMEDABAD-380006

MARCH 2023



Estd. 1863

GUJARAT ARTS & SCIENCE COLLEGE

ELLISBRIDGE, AHMEDABAD - 380 006.

(Government of Gujarat)
(NAAC Accredited Grade 2.83)

Phone : 079-26446939, Fax : 079-26446939, Email : gascprin@gmail.com

Ref No.

No./GASC/

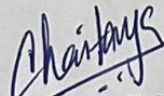
Date : 8-4-2023


CERTIFICATE

This is to certify that this dissertation entitled "ANTAGONISTIC ACTIVITY OF INDEGENOUS ENDOPHYTES AGAINST *Fusarium oxysporum*" submitted to Department of Microbiology & Biotechnology University School of Science, Gujarat University, Ahmedabad-380009 by Miss Nishaben Narendrabhai Mevada for the degree of Master of Science in Microbiology is the bonafide records of original work done by the candidate, from Academic year Dec 2022 – April 2023 under the supervision of **Dr. Chaitanya K Jha**. The work was planned, organised and executed in Microbiology Department, Gujarat Arts and Science College, Ellisbridge, Ahmedabad-380006. This studied has not previously formed the basis for the award of any degree, diploma, fellowship or any other similar title. We further certify that the entire thesis represents the independent work of **Nishaben Narendrabhai Mevada** and all research work undertaken by the candidate under any supervision and guidance.

Dated: 08/04/23

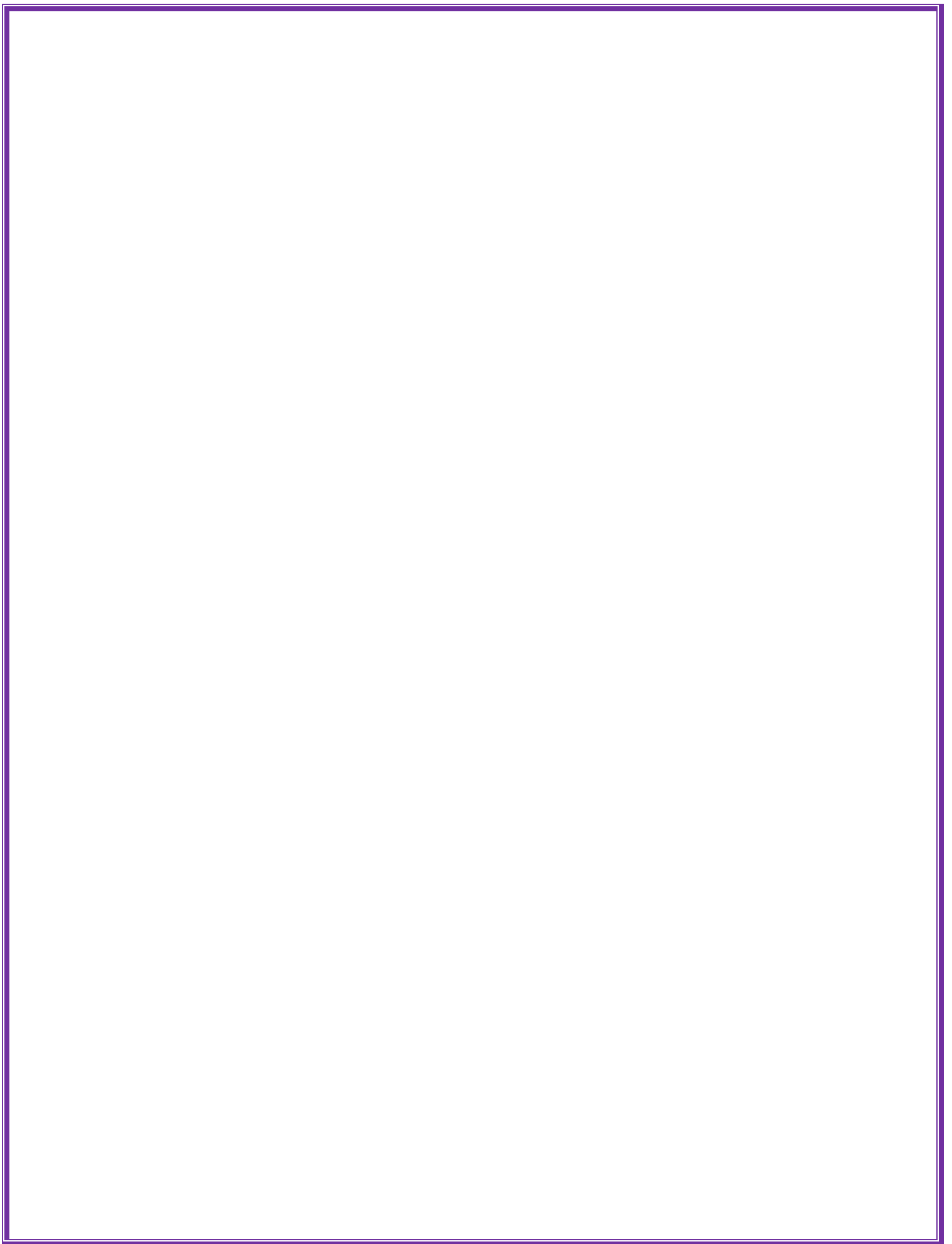
Place: Ahmedabad


Dr. Chaitanya K Jha,
Head,
P.G. Centre of Microbiology
Gujarat Arts and Science College
Ellisbridge, Ahmedabad-380006
India.


Principal,
Gujarat Arts and Science College
Ellisbridge, Ahmedabad-380006
India.

6. Conclusion:

- We isolated eight bacteria which were able to produce antibiotics from the soil sample taken from Junagadh, Gujarat using crowded plate technique. We designated them as VNM1, VNM2, VNM3, VNM4, VNM5, VNM6, VNM7 and VNM8.
- Further we determined their antagonistic activity against *Fusarium oxysporum* using dual plate assay. VNM1, VNM2, VNM3, VNM4, VNM5, VNM6, VNM8 were able to inhibit the fungi.
- Further their biocontrol traits were checked by determining their ability to produce HCN and ammonia. VNM1, VNM3, VNM4, VNM6 and VNM8 were able to produce HCN hence they can inhibit fungi as cyanide seems to be toxic for fungi. All the bacterial isolates were able to produce ammonia.
- Their plant growth promoting activity was determined by determining their ability to solubilize zinc. VNM1 showed the highest ZSI while VNM4 and VNM7 were unable to solubilize zinc. Using broth assay we determined that VNM1 showed the highest result for zinc solubilization.
- From the above test, we observed that VNM1, VNM3 and VNM6 showed almost all the test positive and can be further be used for pot experiment to determine their ability in plant disease management.
- From the pot experiment conducted on *Arachis hypogaea*, VNM1 showed better results and was able to protect the plant from disease and help the host plant to resist and also showed plant growth promoting activity. Hence it was the most potential isolate which showed antagonistic activity against *Fusarium oxysporum* and it can be used as a biocontrol agent.
- The identification of VNM1 was carried out using its morphological, cultural characterization, biochemical tests and 16s rRNA sequencing. From all the tests VNM1 was identified as *Bacillus pumilus* which had fungicidal ability and also had additional properties of plant growth promoting activity.



**“EVALUATION OF TANNASE FROM *Aspergillus Sp.*
FOR TANNIN REMOVAL OF DIFFERENT FRUIT
JUICES”**

A dissertation submitted to
Department of Microbiology and Biotechnology
University School of Science, Gujarat University
Ahmedabad -380009



In partial fulfilment of the requirements for the Degree of

Master of Science

In

Microbiology

By

Ms. ParmaPooja

Ms. Patel Dhruvi

Ms. Gaytri Chhattiyar



Microbiology Department, Gujarat Arts and Science College, Ellisbridge
Ahmedabd-380006

Year: - 2022-23



Estd. 1863

GUJARAT ARTS & SCIENCE COLLEGE

ELLISBRIDGE, AHMEDABAD - 380 006.

(Government of Gujarat)

(NAAC Accredited Grade 2.83)

Phone : 079-26446939, Fax : 079-26446939, Email : gascprin@gmail.com

Ref No.

No./GASC/

Date : - - 201

This is to certify that this dissertation entitled “**EVALUATION OF TANNASE FROM *Aspergillus Sp.* FOR TANNIN REMOVAL OF DIFFERENT FRUIT JUICES**” submitted to Department of Microbiology & Biotechnology University School of Science, Gujarat University, Ahmedabad 380009 by **Ms. Parmar Pooja** for the degree of Master of Science in Microbiology is the bonafide record of original work done by the candidate, from academic year Dec 2022-April 2023, under the supervision of **Dr. Chaitanya K Jha**. The work was planned, organized and executed in Microbiology Department, Gujarat Arts and Science College, Ellisbridge Ahmedabad, 380006. This study has not previously formed the basis for the award of any degree, diploma, fellowship or any other similar title. We further certify that the entire thesis represents the independent work of Brinda Atulbhai Nirmal and all the research work was undertaken by the candidate under my supervision and guidance.

Date :

Place : Ahmedabad

Dr. Chaitanya K. Jha

Principal

**Head,
P.G. Center of Microbiology**

**Gujarat Arts and Science College,
Ellisbridge, Ahmedabad-380006**

Gujarat Arts and Science College,

Ellisbridge, Ahmedabad-380006



Estd. 1863
GUJARAT ARTS & SCIENCE COLLEGE

ELLISBRIDGE, AHMEDABAD - 380 006.

(Government of Gujarat)

(NAAC Accredited Grade 2.83)

Phone : 079-26446939, Fax : 079-26446939, Email : gascprin@gmail.com

Ref No.

No./GASC/

Date : - - 201

This is to certify that this dissertation entitled “**EVALUATION OF TANNASE FROM *Aspergillus Sp.* FOR TANNIN REMOVAL OF DIFFERENT FRUIT JUICES**” submitted to Department of Microbiology & Biotechnology University School of Science, Gujarat University, Ahmedabad 380009 by **Ms. Patel Dhruvi** for the degree of Master of Science in Microbiology is the bonafide record of original work done by the candidate, from academic year Dec 2022-April 2023, under the supervision of **Dr. Chaitanya K Jha**. The work was planned, organized and executed in Microbiology Department, Gujarat Arts and Science College, Ellisbridge Ahmedabad, 380006. This study has not previously formed the basis for the award of any degree, diploma, fellowship or any other similar title. We further certify that the entire thesis represents the independent work of Brinda Atulbhai Nirmal and all the research work was undertaken by the candidate under my supervision and guidance.

Date :

Place : Ahmedabad

Dr. Chaitanya K. Jha

Principal

**Head,
P.G. Center of Microbiology**

**Gujarat Arts and Science College,
Ellisbridge, Ahmedabad-380006**

Gujarat Arts and Science College,

Ellisbridge, Ahmedabad-380006



Estd. 1863
GUJARAT ARTS & SCIENCE COLLEGE

ELLISBRIDGE, AHMEDABAD - 380 006.

(Government of Gujarat)

(NAAC Accredited Grade 2.83)

Phone : 079-26446939, Fax : 079-26446939, Email : gascprin@gmail.com

Ref No.

No./GASC/

Date : - - 201

This is to certify that this dissertation entitled “**EVALUATION OF TANNASE FROM *Aspergillus Sp.* FOR TANNIN REMOVAL OF DIFFERENT FRUIT JUICES**” submitted to Department of Microbiology & Biotechnology University School of Science, Gujarat University, Ahmedabad 380009 by **Ms. Gaytri Chhrtiyar** for the degree of Master of Science in Microbiology is the bonafide record of original work done by the candidate, from academic year Dec 2022-April 2023, under the supervision of **Dr. Chaitanya K Jha** . The work was planned, organized and executed in Microbiology Department, Gujarat Arts and Science College, Ellisbridge Ahmedabad, 380006. This study has not previously formed the basis for the award of any degree, diploma, fellowship or any other similar title. We further certify that the entire thesis represents the independent work of Brinda Atulbhai Nirmal and all the research work was undertaken by the candidate under my supervision and guidance.

Date :

Place : Ahmedabad

Dr. Chaitanya K. Jha

Principal

**Head,
P.G. Center of Microbiology**

**Gujarat Arts and Science College,
Ellisbridge, Ahmedabad-380006**

Gujarat Arts and Science College,

Ellisbridge, Ahmedabad-380006

Contents:

Sr No.	Content	Page No.
1.	Introduction	1
2.	Review of Literature	15
3.	Materials and Methods	25
4.	Results and discussion	33
5.	Conclusion	55
6.	References	57
7.	Appendix	66

List of Figures:

Figure No.	List	Page No.
Figure 1	Crystal structure of fungal tannase from <i>Aspergillus niger</i>	2
Figure 2	Esterase and depsidase activity of tannase on gallotannins	3
Figure 3	Classification of tannins	4
Figure 4	General mechanism of tannase enzyme.	9
Figure 5	The different types of substrates hydrolyzed by tannase	11
Figure 6	Desterification of tea phenols by tannase	12
Figure 7	The biodegradation metabolic pathway of gallotannins is presented above	17
Figure 8	Canonical structure of the / hydrolase fold	23
Figure 9	Isolates of <i>Aspergillus sp.</i>	34
Figure 10	Microscopic view of <i>Aspergillus sp.</i>	35
Figure 11	Inoculum prepared for Tannase production in Czapeck-Dox broth.	36
Figure 12	Czapeck-Dox fermentation broth for Tannase production	36
Figure 13	Fermented Czapeck-Dox broth having <i>Aspergillus</i> growth	37
Figure 14	Filtration of Czapeck-Dox broth for removal of mycellial growth.	38
Figure 15	Filtered Czapeck-Dox broth is mixed with acetone in 1:2 ratio at 4°C.	38

Aim:-

- ⇒ Production of Tannase and its application for tannin removal in different fruit juices.

Objectives:-

- ⇒ Isolation and identification of *Aspergillus sp.* from soil for Tannase production.
- ⇒ Production of Tannase from potential *Aspergillus sp.* isolates by submerged fermentation.
- ⇒ Partial purification and extraction of Tannase from fermented broth.
- ⇒ Tannase assay and Gallic acid estimation.
- ⇒ Immobilization of Tannase.
- ⇒ Use of immobilized enzyme for tannin degradation from juices, Aonla (amla), Pomegranate, Grape juices and gallic acid estimation of juices.